

HIPPI-6400 Optical Meeting Minutes
February 4, 1997
San Jose, California

This copy includes the corrections made at the April 8, HIPPI-6400 Optical meeting

Opening remarks and introductions

The HIPPI Chairman, Don Tolmie of Los Alamos National Laboratory, opened HIPPI Optical portion of the HNF meeting and thanked Bob Snively and Sun for hosting this meeting. This group is constituted as both the HIPPI special working group (SWG) under X3T11, and the HIPPI Networking Forum (HNF) - Technical Committee (TC).

Don lead a round of introductions. The list of attendees is at the end of these minutes.

Review / modify the draft agenda

The draft agenda had been set at the Minneapolis meeting in December. No changes or additions were requested.

Review Minutes of Previous Meeting

No separate HIPPI-6400 Optical minutes were generated for the December meeting in Minneapolis. Don Tolmie read the HIPPI-6400 Optical comments he had included in the HIPPI-6400 minutes (which were available on the HIPPI Standards web page), and they were accepted as being accurate.

Eye Safety

Dan Brown of AMP presented "HIPPI Optical Link Budget Proposal (Breaking the laser safety logjam)". Summary of proposal: CDRH 1040.1 covers Class 1 or Class 3b only; -6 dBm for 0.2 NA. IEC825 Class 3a is acceptable for 850nm; -3 dBm for 0.2 NA. IEC825 requires a label on the Tx port and connectors (just one label at patch panel is sufficient). It also requires a location in a restricted environment OR a special

tool to remove the connector. Dan's proposed solution was to transmit with -6 to -12 dBm (array type source requires at least 6 dB); receive at -18 dBm @ 10^{-12} ; reach >250m 62.5 μ m; >550m 50 μ m.

Tolmie asked if we need restriction on removal? Can someone lose an eye? Brown replied that Class 3a allows more power. Steve Joiner said that HP's understanding is that Class 3a requires the label "Do not look into beam with apparatus that aides the eye (e.g. Eye loop)"; Class 1 does not require such a label. Dan Schwartz asked about the tool for removal - who bears the burden of deciding whether a tool is needed?

Roger Ronald surmised that Class 1 CDRH and IEC are not same, and was met with agreement. Dan replied that they are moving toward convergence, but are not there - maybe 2 years away. A likely approach is to bring Class 3a to CDRH, rather than expecting IEC to authorize higher power Class 1.

When asked if meeting both Class 1 and IEC was doable, Dan replied "no, it requires -22 dBm. Mark Stratton asked if it was sold as a Class 3a or 3b product? Dan said it was sold as Class 3a, since label and warnings are present. Mike Griffin said at 1 Gbit/s? Someone asked if the cable plant budget OK, especially with connectors with 2 dB loss. Dan Schwartz said that > 0.2 NA is required. Trace-ability does not seem to be a requirement for Class 3a.

Ron Soderstrom addressed the harmonization of the IEC and CDRH documents. The USA approach is to accept IEC in general, with exception to the measurement method. IEC assumes 50mm (eye loop-like); CDRH assumes no-divergence effect (larger aperture). Lobbying would be required. Schelto van Doorn said that

Europeans are concerned about individuals with strong eye glasses. Tad Szostak said that a 10x eye loop is an actual possibility. Stan Swirhun asked if CDRH harmonization would result in other labeling; and the answer was "unknown".

Mike Griffin asked if we needed a motion on Dan's proposal. Schelto van Doorn said he would second it if one were made. Joe Parker asked if it would be general purpose solution. Someone said that the link budget is generally OK with Motorola. Stan Swirhun noted that these link budgets are not in agreement with Fibre Channel signal levels, or the levels expected to be required for Gigabit Ethernet. Dan Brown said that they are waiting for more information and a CDRH ruling.

Someone asked "What is the eye safety open-bore/fiber coupled range?" There was lots of discussion on what the eye safety implications are for both of these situations.

Tolmie asked if we should adopt Dan Brown's proposal as a 'baseline proposal' and place it on the agenda for a vote at the next meeting. Joiner said that this is acceptable to move forward. Three issues: i) more sensitivity, ii) array and variation in source array, and iii) we are actually specifying fiber coupling NA, whether we realize it or not. This is the best proposal for a non-OFC, and the only reasonable solution on a tough transceiver spec issue. Greg Chesson said that a non-OFC solution is better than one using OFC, i.e., can't we reduce our transmitted power and seal the specification. Brown and Schwartz replied that applications other than HIPPI may not accept OFC solutions. Tolmie noted that Fibre Channel is standardizing away from OFC. Joiner said that HP prefers OFC. Brown said that AMP has a customer base willing to accept Class 3b. This discussion will be continued later.

HIPPI-6400-OPT document

Don Tolmie reviewed the action taken the previous day to split the optical portion out of the HIPPI-6400-PH document. A low voltage (PECL-like), copper interface will be specified

for connection to optical components. The MAC, 4b/5b coding, clock skew adjustments, etc. will be retained in the HIPPI-6400-PH document. A major reason for the split was to be able to forward the HIPPI-6400-PH document in the June timeframe. Another reason is so that the resulting optical specification can be used for other than HIPPI.

The optical portion will be called HIPPI-6400-OPT. It will specify a 12-bit-wide interface, with 1 Gbit/s on each signal. (Note that the copper interface is 20-bit-wide at 500 Mbit/s.) OFC and non-OFC, the connector and cable will be included in HIPPI-6400-OPT. It was noted that this followed the direction that Roger Cummings, X3T11 Chairman, was proposing for the X3T11 sub-groups.

Don asked if it was reasonable to split out the optics as proposed. Steve Joiner said that market pull and energy level will effect the final direction. Also, if an OFC solution were proposed, then the hooks for OFC would have to exist within HIPPI-6400-PH. Ed Cady and Schelto van Doorn said that a merit of one document is simplicity; fewer cross references. Schelto said that this activity could be folded into FC optical group, but this would not get folded into the HIPPI specification. When asked about a document editor, Don Tolmie volunteered (as long as there was good technical support from the optical experts).

Greg Chesson asked if this document were not in HIPPI-6400, how would this document progress? Who would forward it? If we move the document, do the optical decisions stick? Do our optical decisions get undone? — If the document gets split out, it will likely not move for a long time. If the HIPPI-6400-PH document must get forwarded in June, then March is the effective date for termination of document development. Schelto noted that this time frame is very aggressive. Stan Swirhun noted that we don't have any hope of getting the optics done by March, to allow forwarding in June. Schelto said that they could steal time on Monday in plenary

week for optical issues. Tolmie felt this was a good approach.

Electrical I/O Specifications

Hansel Collins summarized his proposed electrical specifications as: advanced PECL, ac coupled, symmetrical differential signals. The SuMAC is insensitive to whether it drives PECL or CMOS (2.5V) swings. Steve Joiner asked if a 50% duty cycle is guaranteed, and Hansel said yes, except during training sequences. The issue is if adjacent signals can get stuck high, and if so, then use ac coupling. Hansel expressed a preference for OFC in the optical module. Ron Soderstrom asked if there was an issue with 4b/5b non-dc balance affecting eye safety and the answer was "No, not over 1000 seconds".

Steve Joiner asked if a status signal was required to the SuMAC? Hansel said that if the SuMAC fails, all the optical (ac) levels would be pulled one way; it may be possible to do this with dc levels too. Joe Parker and Hansel requested a signal that is a loss-of-light signal. This is an extra requirement since the copper implementation uses a 13th line for loss-of-light. Roger Ronald and Greg Chesson stated that there is no way to get an additional signal on the SuMAC to/from an optical transceiver. Steve Joiner questioned if a really crude loss-of-light signal would do – FDDI did not have it and it cost everyone money. Hansel replied that a crude signal would be OK. Joe Parker commented that we just need one channel with a power monitor. Steve Joiner said that a power monitor costs 2x in power, and would prefer not to do it. Hansel said that his original proposal described an active low loss-of-light signal. Steve said that ac coupled PECL-level signals are expected, and OK.

Connector selection

Don Tolmie said that someone had expressed concern before the meeting about the voting rules for the connector vote, afraid that someone may try to pack the meeting. Don went back over the minutes of the last six months and extracted the

companies represented. He proposed letting these 50 companies have voting rights for this vote since they had been active and participating in the process, with one vote per company. An alternative would be to open it to the entire X3T11 membership – there was opposition to this. Hence, if this is your first meeting you can't vote. If you attended within the last six months you can. Don then read the list of eligible companies. Cray Research was deleted from the list as it is now part of SGI. HNF was also deleted from the list as being inappropriate.

Carol McGill of Corning moved, and Roger Ronald of Raytheon E-Systems seconded, that the list, as read, be accepted as the eligible voters. Pat Wienier or Page Automated Telecom objected to being excluded since this was their first meeting, but they felt that they were knowledgeable and had a vested interest. Sherman Zhu of Optobahn also requested a vote – he had given a presentation at the June '96 Santa Fe meeting, but missed the last six month's meetings. Michael McGowen of Essential Communications offered a friendly amendment to include Page Automated Telecom and Optobahn to the list, and it was accepted. The main motion passed, 23 for, 4 opposed, 0 abstentions.

The procedure agreed to at the previous meeting was to have short presentations by the companies that had also presented at the December '96 meeting, and then select among the four connector presented.

Ed Cady of Berg Electronics had presented the Mini-MAC connector at the December meeting, but at this meeting withdrew the Mini-MAC connector from further consideration.

Jim Kevern of AMP moved, and Dave Hyer of Digital Equipment Corp seconded, to use a Delphi voting scheme proposed. (Under this scheme: 1 of 3 connector choices would be eliminated first, then the second vote would be taken). Steve Joiner of Hewlett Packard offered a friendly amendment to use an Approval method rather than Delphi. A general discussion ensued on the merits of the Delphi and Approval

methods of voting. (Under the approval method, with three choices before the group, we have two voting rounds. In round 1, each company is allowed up to two votes, one vote to each of one or more independent solutions. Lowest vote getter is eliminated. At the end of the first round, a second round occurs where each company is allowed one vote. Majority wins.) The motion to accept the Approval method for the connector vote passed: 27 for, 1 opposed, and 0 abstentions.

Al Plotts of AMP distributed handouts and presented the AMP MPX connector. When asked if there was a second source, he said not yet, but AMP believes that it must find a second source. In response to another question, Al said that AMP will license the connector at a reasonable fee. It was noted that at this time AMP does not sell the individual connectors; after AMP feels it has a proper handle on the technology (3Q/4Q'97) AMP would sell connector to other cable assembly vendors. Pilot production is planned for April, volumes about the third quarter. When asked if AMP had any deals with transceiver or cable assembly vendors to include MPX, he replied "none in writing at this time."

Mackie Shiflett of Alcoa-Fujikura (AFL) presented the Hi-Per Link Connector; but did not have handouts. Design principles included minimal protrusion beyond the MT ferrule, and good resistance to pull forces. He noted that the Hi-Per Link connector handles 10K matings, but MTP didn't (Alcoa-Fujikura tests). The Hi-Per Link connector mates to the Motorola OptoBus. Mackie noted that AFL could not get a license for the MTP connector – the only source of supply is US Connect. Hi-Per Link parts are available in February '97, license available in March '97. The ferrule is offset in the connector which makes coupling to the semiconductors easier. A question was raised about the possibility of the guide pins scratching the fiber – Mackie replied that this was a problem common to the MT ferrule, hence to all of the proposed connectors. When questioned about a duplex solution Mackie said that a clip is under design.

There is no second source yet; discussions are ongoing. Motorola testified that any connector strain is not passed to the ferrule.

Todd Hudson of Siecor Corp, and Walter Mostowy of IBM, presented the MTP connector. The IBM presentation addressed in-field use, and they were satisfied. When questioned about mating cycles, he said that it was unlikely to see more than 100 cycles in his application, and no problems had been seen. It was noted that US Connect has cycled MTPs to more than 5000 mating cycles; specified them to 1000, and it works well. The connector is in the process of becoming an IEC standard, so a license is available. Sumitomo is the supplier in Japan. When questioned about the back reflection, Todd noted that the FC spec is for 20 dB. This may be meet on the floor, but is tough in the field.

Don Tolmie collected copies of the presentations and said that he would send copies to anyone who asked.

The voting is summarized in the table on the last page. The round one vote was: MPX 11, Hi-Per 13, and MTP 16; the MPX was eliminated for the next round. The round two vote was Hi-Per 9, MPX 16. Hence, the MTP was selected as the optical connector (for use with the MT ferrule selected at an earlier meeting), for HIPPI-6400.

Companies that were eligible to vote, but were not in attendance, were:

Access Japan
Ascend Communications
C&M Corporation
Cable Design Technologies
Dainichi
Gigalabs
Harris
Judd Wire/Sumitomo
Lockheed Martin
MacDonell Douglas
Mitre
NCSA
PRP Systems Inc.
Pulse/Technitrol

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Solution Technology
Sumisho Electronics
Tensolite
Triquint
Unisys
Ziga Corporation

Planning

The April 5, 1997 meeting in Palm Springs, CA, will also meet from 2 PM - 5 PM. The proposed agenda is:

Review minutes of February, San Jose meeting
Eye Safety
OFC
Electrical I/O Specifications
Link Budget
Planning

Adjournment

The meeting adjourned at 5 PM.

Attendance

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Connector voting tally –

Company	1st Round			2nd Round	
	MPX	Hi-Per	MTP	Hi-Per	MTP
3M		x		x	
Alcoa-Fujikura		x		x	
AMP	x		x		x
Andrews Assoc. Inc		x		x	
Berg	abstain				x
Corning			x		x
Digital Equipment Corp	x	x		x	
Essential Communications			x		x
Framatome Connectors USA	x		x		x
Fujikura Technology		x		x	
Hewlett-Packard	x		x	abstain	
Honeywell		x		x	
IBM	abstain			abstain	
Los Alamos National Lab		x	x		x
Lucent Technology		x	x		x
Methode		x		x	
Motorola		x		x	
NASA Ames	x		x		x
NTT International Corp.		x		x	
Optivision	x		x		x
Raytheon E-Systems	x		x		x
Siecor	x		x		x
Siemens	abstain			abstain	
Silicon Graphics	x		x		x
Sun		x	x	abstain	
US Connect	abstain				x
Vixel Corporation	x		x		x
W.L. Gore & Associates			x		x
Optabahn			x		x
Page Automation	x	x		abstain	
Totals	11	13	16	9	16